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WATER POLLUTION SURVEY OF THE HAMLET OF HAMMOND TOWNSHIP OF CLARENCE COUNTY OF RUSSELL

1977

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WATER POLLUTION SURVEY

OF THE

HAMLET OF HAMMOND

TOWNSHIP OF CLARENCE

COUNTY OF RUSSELL

1977

by: P. J. Sauvé, Environmental Officer
Municipal & Private Abatement Section

WATER POLLUTION SURVEY OF THE HAMLET OF HAMMOND

IN THE COUNTY OF RUSSELL

INTRODUCTION

The purpose of this report is to summarize the water pollution conditions in the Hamlet of Hammond as observed October 20, 1976 by staff of the Eastern Ontario Health Unit and staff of the Municipal and Private Abatement Section of the Ministry of the Environment. In addition to a program undertaken by the aforementioned, to determine the adequacy of private sewage disposal systems, staff from this Ministry (on October 25, 1976) monitored the water quality discharged from various ditches, storm sewer outfalls and creeks within the municipal boundaries.

OFFICIALS INTERVIEWED

Mr. Richard Lalonde - Clerk, Township of Clarence
Mr. Gerard Lefebvre - Director, St. Mathieu School
Mr. Leon Bouvier - Resident, Hammond
Mr. Ronaldo Guindon - Operator, Hammond Water Works

LOCATION

The Hamlet of Hammond is located in the west central section of the Township of Clarence, approximately 9.5 miles south of Rockland, on County Road 1A. The community is composed of residential and commercial establishments. There is no industry in the Hamlet.

POPULATION

The present population is 360, including approximately 85 residences and 10 commercial establishments and institutions. Although there is no industrial growth in the municipality, the population is expected to continue to increase, due to the proximity of the Hamlet to the Ottawa area.

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Ontario

Ministry of the
Environment
4 Montreal Road, Second Floor
Cornwall, Ontario
K6H 1B1
Tel. (613) 933-7402

June 19, 1978

Ms. Susan Seamen,
Bibliographic Services Centre,
Ministry of Government Services,
80 Bay Street, 5th Floor
Toronto, Ontario.

Re: Township of Clarence - Water Pollution Survey - Hammond

Dear Ms. Seamen:

As requested, I am forwarding a copy of the report "Water Pollution Survey of the Hamlet of Hammond, Township of Clarence, County of Russell."

If we can be of further assistance to you in this regard, please contact our office.

Yours truly,

G. J. McKenna,
District Officer,
Municipal & Private Abatement.
Southeastern Region

GJM/ma
encl.

TOPOGRAPHICAL AND GEOLOGICAL CONDITIONS

Precambrian rocks underlie the entire Hammond area and form the base on which all subsequent sedimentary rock formations lie. The Ottawa formation underlies most of the study area and consists mainly of grey limestone with some dolomite shale and sandstone in the lower parts.

The bedrock surface varies from about 300 feet above mean sea level (a.m.s.l.) three miles west of Hammond to less than 40 feet a.m.s.l. just west of Hammond, and rises two miles to the east at an elevation of about 200 feet a.m.s.l. along the lines of two major faults extending in a northwest - southeast direction following the same trend as that of the old Champlain Sea channels.

DRAINAGE

The municipality is trisected north, south and east of the main intersection by branches of the North Indian Creek. Surface waters consequently flow via ditches, drains and storm sewers to these tributaries. The Hammond drain flowing west-east in the southern half of the Hamlet, is part of the South Branch of the Indian Creek.

EXISTING WATER AND SEWAGE SERVICES

A municipally owned and operated piped-water supply services the Hamlet, with sewage disposal facilities being private and in some cases non-existent. More explicit details on the private services will be provided later in this report.

SAMPLING STATIONS & RESULTS

Samples were collected from thirteen stations and were submitted for bacteriological examination and chemical analyses. The results are shown in Appendix One. Samples were bacteriologically examined at the Ministry of the Environment Laboratory utilizing the Membrane Filter Method. The chemical samples were also analyzed at the Ministry of the Environment Laboratory.

A description of the major sampling stations and amounts on the results of samples collected at these stations are summarized as follows:

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# 3 - Storm drain to swamp, southeast corner. At this outfall, flows come from the east and west along the road between lots 15 and 16, and converge to a low point approximately 170' east of the main intersection where they drain south to a swamp. The bacteriological examination result of the sample collected at this point revealed that the total and faecal population was high, although the five-day B.O.D. and suspended solids were not abnormally high for a storm sewer discharge, there is an indication that some domestic wastes were present in the liquid being discharged from the sewer.

# 6 - Ditch to Indian Creek, south side of road between lots 15 and 16, 0.4 miles east of main intersection. Drainage area extends from 0.25 miles west of sampling point and also includes run-off from a storm ditch lateral to a township road running south-north to the above road. Part of the area being drained is perimetered on two sides by a farm. Samples collected from this point indicated high bacteriological results, but the chemical analyses indicated that $B.O.D._5$ and suspended solids levels were down.

# 9 - Storm drain and ditch approximately 800' north of main intersection on the west side. This particular section had very high coliform counts and the $B.O.D._5$ and suspended solids concentrations were indicative of sanitary waste discharges.

SUMMARY OF RESULTS

All of the samples collected from the storm sewer outfalls and ditches indicated high coliform counts. The chemical analyses generally indicated that the $B.O.D._5$ and suspended solids concentration were low except for sample #9 and would not cause any serious degradation to the chemical quality of the receiving stream. However, it is evident by the high coliform that there is some domestic waste gaining access to the storm sewer and storm ditch system. Also, sample #14 (swamp) is indicative of very high coliform counts which are a result of improper sewage disposal systems of residences south and east of the crossroads and is definitely a health hazard. Elimination of domestic waste discharges to

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storm sewers and proper waste disposal systems should resolve the pollution in the receiving stream.

SANITARY SURVEY

On October 20, 1976, a door-to-door survey was conducted in Hammond. The purpose of the survey was to determine the actual extent of the pollution problems related to inadequate sewage systems. The method of waste disposal was determined and recorded; information was obtained from the occupants of the dwellings or commercial establishments. In some cases, the occupant was unable to provide information on the sewage disposal system. In addition to the staff of the Municipal & Private Abatement Section of the Ministry of the Environment, assistance was provided by three staff members of the Eastern Ontario Health Unit's district office in Casselman.

A summary of the survey results were reported to Mr. R. Lalonde, Clerk of the Township of Clarence and Mr. J. Leveille, Secretary, Prescott-Russell School Board, in letters dated November 29, 1976, from the Eastern Ontario Health Unit.

SEWAGE DISPOSAL

Information was obtained on private waste disposal methods utilized by 95 establishments. This information is summarized as follows:

1) Number of establishments with septic tanks and tile beds (all sewage being discharged to system) - 61

2) Number of establishments with septic tanks and tile beds (wash water discharged to storm sewer and open ditches) - 7

3) Number of establishments with sanitary wastes being discharged directly to storm sewer or open ditch - 4

4) Number of establishments with cesspools with effluent pipes discharging into storm sewers - 12

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5) Number of establishments with cesspools with effluent pipes discharging into open ditches - 4

6) Number of waste disposal systems of which discharge effluents are on top of the ground - 2

It was also noted that one residence visited had a pail privy; two others had holding tanks and two others could not be inspected, as the residents were not available on October 20, 1976.

With this type of survey, it was not possible to determine whether the septic tank and tile beds were operating satisfactorily. It may be necessary to do dye testing on some systems to determine if they are functioning properly. To eliminate the pollution load to the storm ditches and storm sewers, direct domestic and sanitary waste discharges and discharges from septic tank effluent should be eliminated. It was also noted, while sampling discharges from storm sewer outfalls and drainage ditches on October 25, 1976, that residences in the north portion of the Hamlet may also have inadequate plumbing, as indicated by the bacteriological and chemical sample results as well as from visual observations. This will be confirmed at a later date.

In summary, it would appear that most of these problems could be solved on an individual basis, by installing proper septic tank systems and tile beds, and in some cases to install holding tanks where lots are too small to accommodate septic tanks and tile bed systems.

COMMUNAL WATER PROJECTS

At the request of the Township council, a groundwater survey was conducted in a radius of about 4 miles of Hammond on September 9th and 10th, 1971 for the purpose of investigating the availability and quality of groundwater as a possible source of municipal supply. The conclusions drawn up were:

1) Ground water conditions in the vicinity of Hammond appeared to be

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sufficiently favourable to warrant test drilling for municipal supplies.

2) Supplies of ground water of acceptable chemical quality for municipal use may be developed from wells in the basal sand and gravel aquifer, east of Hammond or from aquifers in the bedrock in this same area.

3) Additional smaller supplies of ground water may be developed in the shallow sand deposit supplying most of the water for the existing system.

4) From data available, it was indicated that the basal sand and gravel deposit lying at or near the centre of the bedrock valley beneath Hammond, yields water with unacceptably high concentrations of sodium chloride for municipal use.

As a result of the above, in April - May 1975, a ground water investigation was carried out under the supervision of the Ministry of the Environment, to determine the feasibility of developing 100 I.G.M. from an overburden or bedrock aquifer. Three test wells were drilled 42', 83' and 88' respectively into bedrock with negative results, and thus abandoned. A fourth test well was developed in gravel, sand, boulders and clay and pumped for 7 hours at a rate of 7½ I.G.M. but the water was still cloudy and the formation was considered inadequate to meet the objectives of the programme, and was also abandoned. It was therefore concluded that there were no significant aquifers in either the overburden or the bedrock, and a ground water supply of 100 I.G.M. was not available.

At the request of the Township Council, this Ministry checked ground water springs situated about 1 mile from the Village on a direct line between test wells #1-75 and #3-75. However, these springs emanating from the base of a surface sand deposit occurring to the north and east of Hammond, have very poor hydraulic properties in addition to a widely

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varying water table, and thin saturated thickness. This confirmed that development of these springs would be very difficult and costly, producing a supply that would be highly variable in flow.

In January 1976, the Ground Water Development Section completed an investigation and assessment of the potential yield of a spring located on the property of John Nolan on Lot 14, Concession X, Clarence Township. Based on pumping test data and other calculations the average yield was estimated to be about 30 GPM. However, due to poor soil conditions, development of the site was expected to be difficult and costly. Also, the installation of a collector system in the fine material would encounter technical problems and probably result in the capture of only a portion of the total expected flow; being vulnerable to contamination, full treatment would be required to ensure safety for consumption purposes.

SEWAGE PROJECT

To date, a communal sewage works project has not been proposed for the Hamlet. The only watercourse in the area is North Indian Creek and the flow is not considered to be large enough to assimilate the effluent discharge from a sewage treatment facility. The cost of providing a waste stabilization pond and spray irrigation system is considered to be very expensive. Private sewage disposal systems are considered to be the only feasible alternative to resolving the pollution problems since most lots are large enough to accommodate septic tanks and tile bed systems. In some cases where the lots are small, it may be necessary to install holding tanks.

There is presently a proposal to drain the existing swamp located southeast of the main intersection behind the residences, on a property belonging to Mr. Rene Guindon. The proposed method is by means of a ditch leading south to the Hammond Drain and by-passing St. Mathieu Primary School yard.

The swamp, which was sampled in May 1976 as a result of a complaint, had a bacteriological faecal coliform count of 3300, and total coliform count of 19,000,000 indicating that raw sewage is being discharged to the swamp.

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The parcel of land where the bog is located may be the site of a future subdivision, and drainage is proposed to the Hammond Drain. However, this would not abate the pollution, as the source is still there.
If proper sewage disposal facilities are installed in the Hamlet, then drainage of this swamp could be diverted to the Hammond Drain without creating a health hazard.

SUMMARY

A water pollution survey conducted in the Hamlet of Hammond revealed that there are water pollution problems in Hammond. Sampling of storm sewer outfalls and swamp indicated the presence of coliform bacteria and periodic discharges of waste from some sampling points exhibiting high $B.O.D._5$ and suspended solids concentrations. The survey also indicated that there are a large number of inadequate private sewage disposal systems in the community.

A ground water survey conducted in 1975 to determine the feasibility of developing 100 IGM from an overburden or bedrock aquifer was fruitless. In January 1976, an investigation and assessment of the potential yield of a spring located on Lot 14, Concession X, Clarence Township was completed and the results were also negative.

The inadequacy of the North Indian Creek to assimilate a lagoon's annual discharge, coupled with high costs of such a system, all but rule out communal sewage services.

The intention to drain a swamp located on Mr. Rene Guindon's property southeast of the main intersection by means of a ditch to the Hammond Drain, should not be done until the pollution problem is abated.

The solution would be for residents discharging raw sewage directly or indirectly to the swamp, to install proper sewage facilities.

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RECOMMENDATIONS

1. Discharge of domestic wastes to storm sewers, ditches, and creeks should be eliminated. To achieve this, private sewage disposal systems should be installed where necessary.

2. Drainage of the swamp on Mr. Rene Guindon's property to the Hammond Drain should not be done until the pollution problem is abated.

3. Future growth in the Hamlet should be limited to areas where private water and sewage disposal systems will function properly.

APPENDIX ONE

HAMLET OF HAMMOND

WATER POLLUTION SURVEY

SAMPLE POINT	DESCRIPTION	5-DAY B.O.D.	SUSPENDED SOLIDS	TOTAL KJELDAHL	TOTAL PHOSPHORUS	COLIFORM ORGANISM TOTAL	COLIFORM ORGANISM FAECAL
1.	Ditch, South side County Rd. 1A 1/5 mile West of Hamlet	0.5	30	1.04	0.136	13,000	100
2.	Ditch, North side County Rd. 1A 1/5 mile West of Hamlet	< 0.5	20	0.70	0.088	1,400	124
3.	Storm drain to swamp, South of Hotel	5	20	2.30	0.580	70,000	264
4.	Storm drain, South side, approximately 1/4 mile East of Hamlet	5	20	1.10	0.520	170,000	170
5.	Indian Creek, North side, approximately 2/5 mile East of Hamlet	0.8	< 15	0.60	0.140	6,200	328
6.	Ditch to Indian Creek, South side, approximately 2/5 mile East of Hamlet	< 0.5	< 15	0.60	0.464	5,100	1,064
7.	Indian Creek, 100 feet downstream, approximately 2/5 mile East of Hamlet	0.8	< 15	1.00	0.150	6,000	300
8.	Ditch, 500 feet North of main intersection, East side	< 0.5	< 15	0.61	0.098	1,700	< 4
9.	Ditch, 800 feet North of main intersection, West side	6	860	7.0	2.04	9,500	520
10.	Hammond Drain, West side of County Rd. 1A, 100 feet upstream	0.5	65	0.50	0.052	1,600	100
11.	Hammond Drain, East side of County Rd. 1A, 250 feet downstream	0.7	< 15	0.13	0.014	42,000	36

APPENDIX ONE

HAMLET OF HAMMOND

WATER POLLUTION SURVEY

SAMPLE POINT	DESCRIPTION	5-DAY B.O.D.	SUSPENDED SOLIDS	TOTAL KJELDAHL	TOTAL PHOSPHORUS	COLIFORM ORGANISM	
						TOTAL	FAECAL
12.	Ditch, 1/4 mile South of main intersection, East side	4	65	6.5	2.15	75,000	88
13.	Ditch, 1/4 mile South of main intersection, West side	1	120	1.25	0.380	1,700	12
14.	Swamp - Sampled 18/5/76	-	-	-	-	19,000,000	3,300

APPENDIX TWO

INTERPRETATION AND SIGNIFICANCE OF LABORATORY RESULTS

The analyses employed to assess the water quality of the samples collected during the survey were: total coliform, faecal coliform, Biochemical Oxygen Demand ($B.O.D._5$) and suspended solids.

BACTERIOLOGICAL EXAMINATION

Total and faecal coliform organisms were the bacteriological indicators of contamination used during the survey. Coliforms are found in the intestine, but can also occur on soils and vegetation. Faecal coliforms are found only in human and animal faecal waste, and since they die out more rapidly than coliforms, their presence is considered a sure indication of faecal pollution.

SANITARY CHEMICAL ANALYSES

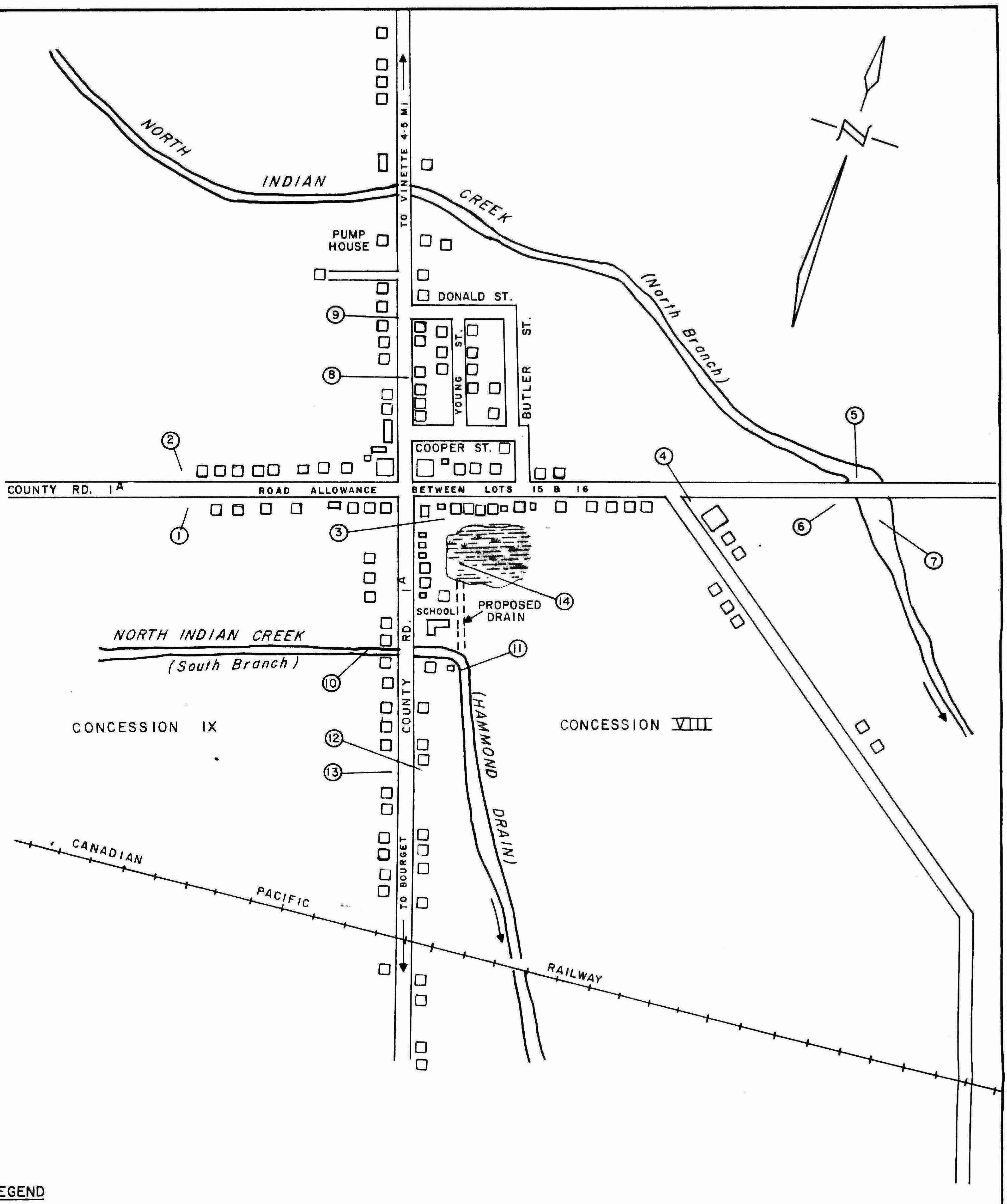
Biochemical Oxygen Demand (B.O.D.)

The biochemical oxygen demand (B.O.D.) of domestic and industrial waste waters is the amount of molecular oxygen required to stabilize the decomposable matter present in a water by an aerobic biochemical action. Since it is impractical in actual work to utilize tests that require more than a few days for reliable results, it is customary to make B.O.D. tests at a standard temperature of 20°C. for a 5-day period, which is about 68% of the ultimate, when a reaction velocity coefficient of 0.10 is used. A high B.O.D. is indicative of organic or chemical pollution. In most cases, adequate protection for surface waters should be provided if B.O.D. concentrations in waste discharges exceed 15mg/l, but in some cases, a much higher concentration can be tolerated while in other cases, a concentration less than 15 mg/l could be detrimental. Special situations have to be examined individually. This will ensure that the biochemical oxygen demand from the various sources does not lower the oxygen concentration in the watercourse below 6 – 7 mg/litre and thus make the watercourse acceptable for various fresh water biota.

Suspended Solids

The suspended solids value is the most significant of the solids determination, and indicates the measure of the undissolved solids of organic or inorganic nature. Organic solids create sludge banks and decompose causing odors and unsightly conditions. Inorganic suspended solids blanket the stream bed affecting benthos organisms.

The effects of suspended solids in water are reflected in difficulties associated with water purification, decompositions in streams and injury to the habitat of fish. In most cases, adequate protection for surface waters should be provided if suspended solids concentrations in waste discharges exceed 15 ppm.



LEGEND

⑦ – SAMPLING STATION

MINISTRY OF THE ENVIRONMENT

HAMLET OF HAMMOND
RUSSELL COUNTY
WATER POLLUTION SURVEY
OCT. 1976

SCALE: 500 0 500 FT.

DRAWN BY : L.L.B.	DATE : MARCH, 1977
CHECKED BY : P.J.S.	DRAWING Nº : 6937

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